

SONNERAT'S SHREW – EVIDENCE FOR A NEW AND POSSIBLY EXTINCT SPECIES IN AN EARLY 19TH CENTURY MANUSCRIPT (MAMMALIA: SORICIDAE)

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Diplomesodon sonnerati described from the excellent diagnosis by Sonnerat in his manuscript *Nouveau voyage aux Indes*.

Key words: Sonnerat, Pondicherry, India, undescribed shrew

Pierre Sonnerat, nephew of the famous French administrator and explorer Pierre Poivre ('Peter Pepper'), was a naturalist, observer of indigenous customs, and himself an administrator in the French colonial empire of the late 18th and early 19th centuries (Ly-Tio-Fane 1976; Deloche and Ly-Tio-Fane 2010). He spent a good deal of time in India in French possessions and outposts (and as a prisoner of the British), and having already published two important books on travel and natural history, had prepared for publication a third manuscript, the *Nouveau voyage aux Indes*, based on his time in southern India from 1786 to 1813. He died in 1814 before it was published, and the manuscript subsequently disappeared until unexpectedly rediscovered in 1978 in the Mitchell Library in Sydney, Australia. The most important parts of the lost book have at last been published (Deloche and Ly-Tio-Fane 2010) in a heavily annotated edition. The text contains general notes on wildlife in various parts of India and also Ceylon (now Sri Lanka), and a small section with dedicated descriptions of animals that Sonnerat believed to be new – including a very distinctive shrew, which has never been recorded since and may be extinct. The other fully described animals are well-known species; in the manuscript they are all rather crudely illustrated with pen sketches, although only one of these is reproduced in the published book. Indian naturalists will recognise the traveller's name in *Gallus sonneratii* Temminck, the Grey Junglefowl.

The shrew and its context

When I visited Mauritius in 2008, the co-author of the new Sonnerat study, Madeleine Ly-Tio-Fane, asked me in 2008 to look over the animal descriptions, and I immediately picked out the shrew as worthy of further investigation. I soon determined that it resembled only one other species. The unusual feature of Sonnerat's shrew is that it was black with a white patch on the back, a feature shared amongst shrews only with the Putorak or Piebald shrew *Diplomesodon pulchellum* (Lichtenstein), known only from Central Asia

(Nowak 1999). *D. pulchellum*, however, differs in having a white belly, and not being sexually dimorphic.

Although I had established to my own satisfaction by early 2009 that Sonnerat's shrew was an undescribed species, the *Nouveau voyage* was not the place to publish this, and in any case I wanted to wait until the manuscript was published and accessible. The authors (Deloche and Ly-Tio-Fane 2010) meanwhile were cautious (p. 314, footnote, my translation): "Had he [Sonnerat] found something new? Anthony Cheke remarks that the only known shrew with blackish fur and a white band on the back is *Diplomesodon pulchellum*, an animal distributed in Central Asia (Kazakhstan, Uzbekistan and Turkmenistan). While close, Sonnerat's description does not match in all respects with that of *Diplomesodon*, but all his descriptions in this book lack a certain precision. Could he have received a specimen from Central Asia? Or are we looking at an extinct species, given that he indicates that he found it in fields a few leagues from Pondicherry?"

Sonnerat did not himself travel to Central Asia, and all the other animals described are from the Subcontinent or Ceylon (now Sri Lanka), apart from a parrot that he stated was imported from Penang (Malaysia), and the migratory Red-headed Bunting *Emberiza bruniceps* Brandt that he reported from extralimital Ceylon, but which he probably encountered as a cage-bird. Hence, there is no reason to doubt that he found the shrew, as he claimed, in the vicinity of Pondicherry (now Puducherry).

Species description

The shrew is described by Sonnerat in two passages, one – a general account of wildlife in southern India, the other – a specific diagnosis, accompanied by a crude pen-sketch (Fig. 1). The passages (my translation) are as follows:

From Chapter 4: "On the Indian monsoons; [and] productions of the Coromandel coast", p. 111, after describing the ubiquitous House or Musk shrew *Suncus murinus* (Linnaeus) and its offensive scent:

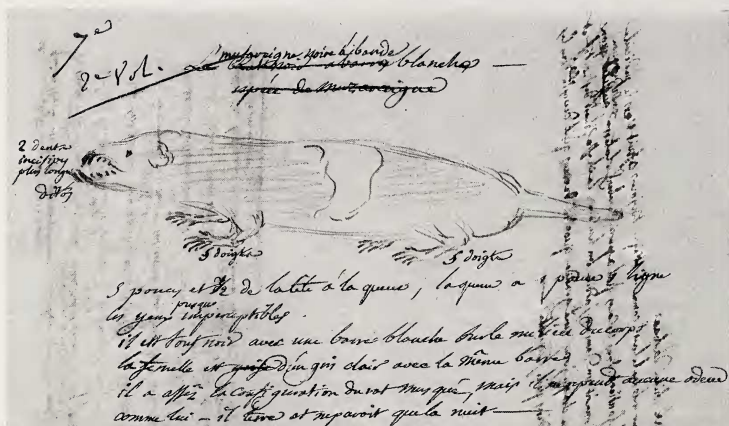


Fig. 1: Sonnerat's sketch, with associated inscriptions, of the "musaraigne noire à bande blanche" [black shrew with white band] from his manuscript *Nouveau voyage aux Indes*, held as Item No. PX*D83 p.32 in the Mitchell Library, Melbourne.

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The vertical writing is show-through from the other side of the paper; it has been digitally softened)

"One sometimes encounters with these *rats musqués*¹ a particular species that has all the characters of a shrew, but it does not generate a smell of musk; it is also larger, shiny black with a white band on the middle of the body."

From Chapter 13, "New items relating to natural history", p. 314, Sonnerat's diagnosis:

"This shrew is five and a half inches² [149 mm] from the head to the base of the tail; the tail is one inch one line [29 mm] in length; the eyes are almost imperceptible and appear only as two little black points. It is entirely a handsome black, with a transverse white band across the middle of the body; all its fur is silky; the female is smaller and has the same transverse white band, but all that is black in the male is a clear grey in the female.

This shrew has the shape and all the characters of the *rat musqué*, but it never inhabits houses like it does, nor does it give off any musky smell; it is also larger; it stays hidden during the day in holes and only appears at night to seek food; I found it in fields a few leagues³ from Pondichery."

¹The term '*rat musqué*' ['musky rat'] is the name long in use in Mauritius for the house shrew, where Sonnerat will have first encountered it before arriving in India (Cheke 2009).

²French inches of 2.71 cm.

³A French terrestrial league, 'lieue' = 4.83 km.

The text around the sketch adds '5 toes' written next to both front and rear legs, 'two longer incisor teeth' against the upper jaw, the same against the lower jaw, and the drawing itself shows large down-curved incisors in the upper jaw, all features typical of shrews, i.e., there is no question that Sonnerat's animal was indeed a shrew. The tail is shown as stout and stubby, similar to that of *D. pulchellum*. The rest of the text by the sketch reprises the edited version of the description.

Sonnerat's very adequate diagnosis is, together with his illustration, sufficient to establish this animal as a species new to science which I am naming:

Diplomesodon sonnerati sp. nov.

It is distinguished from all shrews, apart from *D. pulchellum*, by the white dorsal patch, and from *D. pulchellum* by its much larger size, sexual dimorphism, saddle-shaped white patch (not elongated along the back), and dark (not white) underparts.

The generic attribution is tentative, based on the pelage similarity between this animal and *D. pulchellum*. Sonnerat's shrew is, however, twice as long as the Central Asian species (head + body 54-76 mm, Nowak 1999), and if regularly larger

than *Suncus murinus*, as Sonnerat claimed, would make it the world's largest shrew. *S. murinus* ranges up to 150 mm in head and body length (Prater 1971; Nowak 1999), making it roughly the same size as Sonnerat's example. Although until now extant *Diplomesodon* was thought to be confined to Central Asia, Pleistocene fossils attributed to the genus, based on dentition, have been found in South Africa (Repenning 1965), suggesting that *pulchellum* (and thus also *sonnerati*) may be a relict of a once widespread radiation.

Recent DNA analysis (Dubey *et al.* 2008) nests *Diplomesodon* within the large genus *Crociodura*, though the researchers decided, against the usual practice, to "keep this morphologically highly distinctive taxon in its own genus, although this would render *Crociodura* a paraphyletic taxon". Within *Crociodura* it has a very long solitary branch on the phylogeny, splitting some 5 million years ago from the rest of Asian *Crociodura*. However, another DNA study (Esselstyn and Brown 2009) found it a mystery sister along its branch labelled 'sp. 4, IN'. Further, investigation showed that this was a shrew collected in 1984 near Araku (near Visakhapatnam) in Andhra Pradesh, eastern India (<http://arctos.database.museum/guid/DGR:Mamm:18454>), identified as *C. horsfieldii* (Tomes). The tissue material used for DNA study is held in the University of New Mexico, but the skin is in the Carnegie Museum of Natural History in Pittsburgh, USA (catalogue No. CM 92179). However, this specimen is uniformly brown on the back (Suzanne McLaren pers. comm.), and hence is not an example of Sonnerat's shrew. Since other examples of *C. horsfieldii* cluster very differently in the phylogenies (Dubey *et al.* 2008; Esselstyn and Brown 2009), its anomalous DNA linking it to the central Asian *D. pulchellum* suggests an unidentified cryptic species resembling *horsfieldii* living in central-eastern India, which would warrant further research.

DISCUSSION AND CONCLUSIONS

Since no more specimens have emerged since Sonnerat's time, the species may have been very restricted in distribution and since become extinct, perhaps under modern Puducherry's urban sprawl. However, if rare and confined to a small area around Puducherry, it remains possible that the species survives, and so distinctive an animal would be well-worth searching for. Its habitat appears from Sonnerat's description to include agricultural land, so it may be a generalist, however, searching might best be focussed on uncultivated patches, as modern agriculture (pesticides, mechanisation) may have altered the suitability of arable land.

The recent discovery of *Feroculus feroculus* in southern India, previously thought to be confined to Ceylon (now Sri Lanka) (Pradhan *et al.* 1997), and a new, if cryptic, shrew species in Ceylon itself (Meegaskumbura *et al.* 2007) does allow one to hold out hope for the survival of *Diplomesodon sonnerati*. Let the search begin!

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